

EXHIBIT B

4 pages

In the matter of

State of Oklahoma, ex rel., A. Drew Edmondson in his capacity as Attorney General of the State of Oklahoma, and Oklahoma Secretary of the Environment, C. MILES TOLBERT, in his capacity as the Trustee for Natural Resources for the State of Oklahoma, Plaintiffs

v.

Tyson Foods, Tyson Poultry, Tyson Chicken, Inc., Cobb-Vantress, Inc., Aviagen, Inc., Cal-Maine Foods, Cal-Maine Farms, Inc. Cargill, Inc., Cargill Turkey Products, LLC, George's, Inc., George's Farms, Inc., Peterson Farms, Inc., Simmons Foods, Inc. and Willowbrook Foods, Inc., Defendants.

CASE NO. 05-CV-329- GFK-SAJ

**in the United States District Court
for the Northern District of Oklahoma**

Expert Report

of

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Tenkiller sediments, the concentrations of these parameters in poultry wastes and the concentrations of these parameters in uncontaminated surface soils is further explored in Fig 32. On this plot, the concentrations of Total P, Total Cu, Total Zn and Total As observed in Tenkiller sediments appear to represent a mixture between sediments derived from uncontaminated surface soils and poultry wastes. Total Zn and Total P appear to behave conservatively relative to a mixture of uncontaminated soils and poultry waste. Total Cu appears to become somewhat depleted in sediments relative to Total P in relative to a mixture of uncontaminated soils and poultry waste. This may reflect the somewhat greater environmental mobility of Cu as compared to Zn.¹³² Total As appears to become somewhat enriched in Tenkiller sediments with respect to a mixture of uncontaminated soils and poultry waste.

29. The change in sediment concentrations of and other poultry waste constituents within Lake Tenkiller sediments are directly related to changes in poultry production within the Illinois River Watershed. Concentrations of Total P in Tenkiller sediments from all cores are plotted against year of deposition in Fig 33 as are the populations of total poultry, beef cattle, dairy cattle, swine and humans within the Illinois River Watershed from the data presented in the phosphorus mass balance study.¹³³ The animal and human population data are given in units of biomass (animal units).¹³⁴ The use of animal units places all of the animal populations on a common scale relevant to phosphorus excretion. The concentration of total phosphorus in the dated sediments increases from 313 mg/kg in pre-impoundment sediment to 1,495 mg/kg in the youngest sediment recovered by LKSED-01 (a factor of 4.8). The overall functional form and slope of the sediment total phosphorus concentration is more concordant with the overall functional form and slope of the total poultry population than it is to the overall form and slope of the populations of beef cattle, dairy cattle, swine or humans. Secondly, combining the curves for beef cattle, dairy cattle, swine or humans would not change the functional form or slope of the graph of non-

¹³² Kabala, C. and Singh, B. R. 2001. Fractionation and Mobility of Copper, Lead, and Zinc in Soil Profiles in the Vicinity of a Copper Smelter. J. Environ. Qual. 30:485-492.

¹³³ Expert Report of Bernie Engle, 2008.

poultry animal population from that of beef cattle. Between 1954 and 2002 the number of animal units attributable to poultry increases from 59,587 to 850,201, a factor of 14.27 whereas beef cattle increase from 19,108 animal units to 97,616 animal units, a factor of 5.44; dairy cattle show an overall decrease of nearly threefold from 41,081 animal units to 14,135 animal units, and swine show an increase from 5,934 animal units to 32,278 animal units, a factor of 5.11. The pattern and scale of the poultry population increase within the Illinois River Watershed provides a better explanation of the increase in sediment Total P in Lake Tenkiller than humans, beef cattle, dairy cattle, swine, or any combination of humans and non-poultry animals. Moreover, beef cattle have only a minor role in phosphorous mass balance, and were, in fact, not considered in a recent extensive study of nutrient mass balance in agricultural soils in Arkansas because,

“Nutrients contained in beef cattle manure were ignored in nutrient source estimates since a large proportion of these nutrients are obtained from the forage average and deposited directly (i.e., recycled) to pastures during grazing rather than collected in lagoons or stockpiled from confined animal production facilities.”¹³⁵

¹³⁴ An animal unit, or AU, is 1000 pounds of live animal weight.

¹³⁵ Slaton, N. A. Brye, K. R., Daniels, M. B., Daniel, T. C., Norman, R. J. and Miller, D. M. 2004. Nutrient Input and Removal Trends for Agricultural Soils in Nine Geographic Regions in Arkansas. *J. Environ. Qual.* 33:1606–1615.

Tenkiller Sediment Phosphorous and Animal Populations in the Illinois River Watershed

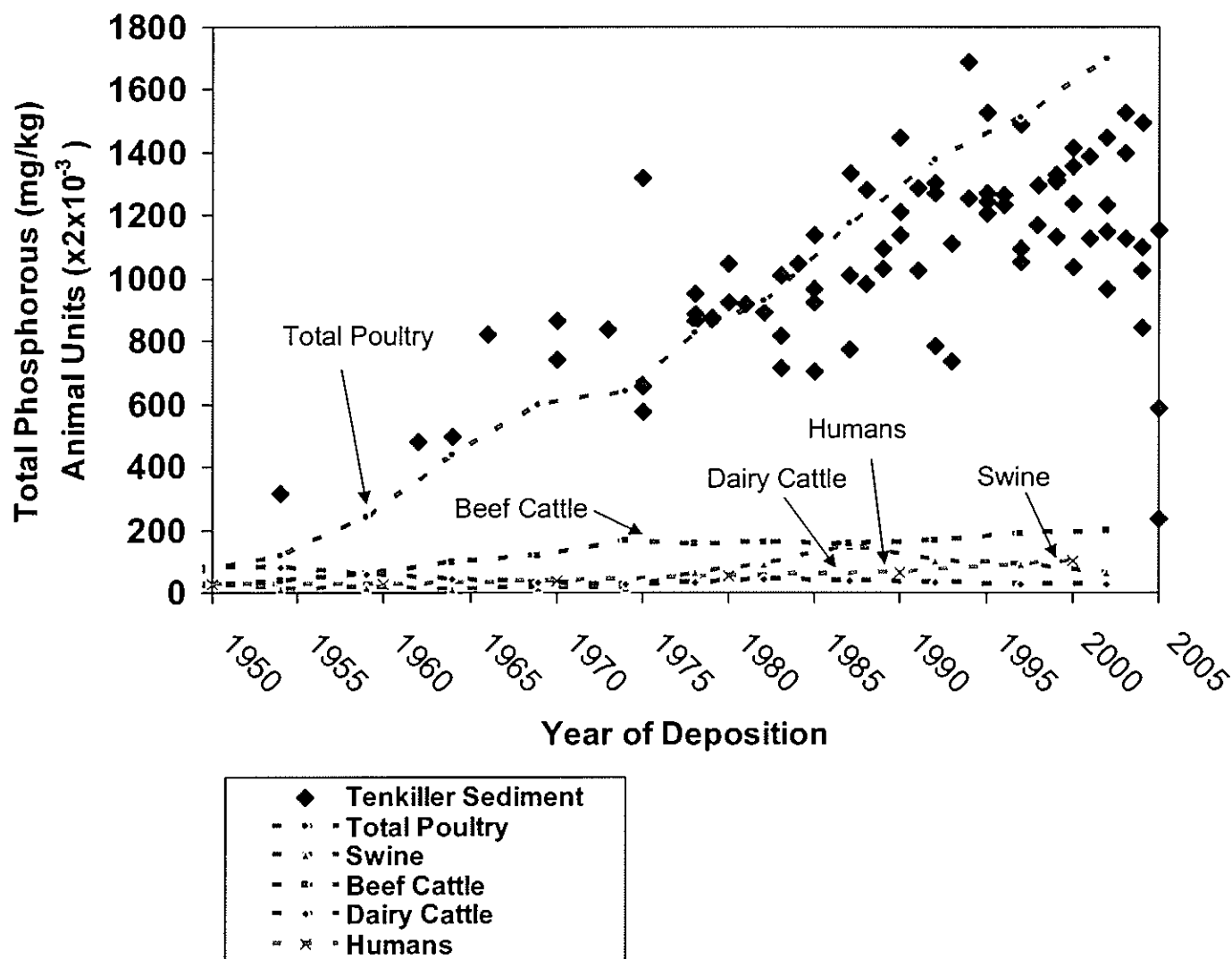


Figure 33. Total phosphorous concentrations in Lake Tenkiller sediment cores as a function of age of sediment deposition and populations of total poultry, beef cattle, dairy cattle, swine and humans in the Illinois River Watershed in animal units (AUs).